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EXAMINER	
SMITH, JEFFREY S	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	**Application No.** 10/678,747	**Applicant(s)** NISHINO, YOICHI	
	Examiner Jeffrey S. Smith	**Art Unit** 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-11 and 13-28* is/are pending in the application.

4a) Of the above claim(s) *13-28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Requirement For Information

Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

In response to this requirement, please provide answers to each of the following interrogatories eliciting factual information that is known to the applicant and the assignee of this application:

Did the Japanese Patent Office make any rejections in Japan 2002-292621 filed October 4, 2002? If so, submit a copy of each rejection.

Did the Japanese Patent Office make any rejections in Japan 2003-103115 filed April 7, 2003? If so, submit a copy of each rejection.

Has the applicant or the assignee filed any applications in any country (other than the United States) that claim priority to Japan 2002-292621 or to Japan 2003-103115 or to both? If so, have any rejections or search reports been made? If so, please submit a copy of each rejection and each search report that has been made.

This information is material to patentability. Applicant is reminded that failure to fully reply to this requirement for information will result in a holding of abandonment. This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the elements of detecting a correlation between said first image data and second image data based on light receiving results of light receiving elements having distinctive variations in light receiving sensitivity of the predetermined image generating apparatus and generating correlation data; and identifying that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is still not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: Data Processing Apparatus and Associated Method of Identifying A Digital Camera by Correlating Two Images.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: an identifying unit configured to identify that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data is missing from the disclosure as originally filed; and the step of identifying that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data is missing from the disclosure as originally filed.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 and 3-11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 1, the element of an identifying unit configured to identify that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data is missing from the disclosure as originally filed.

In claim 10, the step of identifying that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data is missing from the disclosure as originally filed.

In claim 11, the element of an identifying unit configured to identify that said first image data was generated using any of said plurality of image generating apparatuses when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data is missing from the disclosure as originally filed.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 3-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The "value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data" is unclear.

What is an origin of the correlation data? Where is the origin of the correlation data shown in the figures? What example of the origin of the correlation data is given in the specification?

What are the predetermined number of standard deviations? They are the standard deviations of what? Where are the standard deviations shown in the drawings? Where are the standard deviations discussed in the specification? Where is greater than a predetermined number of standard deviations shown in the drawings?

What does based on the correlation data mean? What is based on the correlation data? Is the value based on the correlation data? Is the origin based on the correlation data? Is the standard deviation based on the correlation data? What is a standard deviation that is based on correlation data? Where is based on the correlation data shown in the drawings and discussed in the specification?

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4-5, and 8-10 are rejected under 35 U.S.C. 103 as being unpatentable over Geradts et al., *Methods for Identification of Images Acquired with Digital Cameras* ("Geradts") in view of U.S. Patent Number 6,477,431 issued to Kalker et al. ("Kalker").

For claim 1, Geradts discloses an interface configured to receive first image data to be identified and second image data generated by a predetermined image generating apparatus (see for example figure 2 which shows images from different cameras. Presumably an interface received these images so that they could be averaged and displayed), a correlation detecting unit configured to detect a correlation between said first image data and second image data based on light receiving results of light receiving elements having distinctive variations in light receiving sensitivity of the predetermined image generating apparatus and to generate correlation data (see the right image of figure 4 on page 506, pixel defects which are distinctive variations in light receiving sensitivity of the predetermined image generating apparatus are visible if there is an image taken of a dark object. See also figure 5, pixel defects are visible on the CCD. The distinctive variations provide correlation data as discussed in equation 4 which gives the probability that the correlation data signifies a match), and an identifying unit configured to identify that said first image data was generated using said image generating apparatus (see left image of figure 4, pixel defects in a real image match pixel defects of a dark object. See also equation 4 on page 510, if the pixel defects found in a comparison of a reference image and an actual image exceed a probability threshold, the actual image is identified as taken by the camera).

Geradts does not disclose an identifying unit configured to identify that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data.

Kalker discloses an identifying unit configured to identify that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data (see the abstract the standard deviation of correlation values is determined and a threshold is set to a multiple of the standard deviation).

It would have been obvious to one of ordinary skill in the art at the time of invention to include the threshold of Kalker with the correlation device of Geradts in order to reduce false alarms as taught by Kalker in the abstract.

For claim 4, Geradts discloses a reference image generating unit configured to generate a plurality of image data using said predetermined image generating apparatus (see page 507 “we counted these pixel defects by comparing five images acquired by the same camera") and to average said plurality of image data to generate said second image data (see abstract, "errors can be visualized by averaging the images multiple times." See also figure 2 on page 507, ten blank images are averaged to show pixel defects) and said correlation detecting means detects said correlation using said second image data generated by said reference image generating means (see discussion of Figure 2 on page 507, it "was possible to determine the pixel defects in these cameras").

For claim 5, Geradts discloses a reference image generating unit configured to generate a plurality of said second image data (see figure 4) by making light strike said light receiving elements in a plurality of states of different lens apertures (the lens aperture of the image on the left is different than that of the image on the right.) when said image generating apparatus makes light strike said plurality of light receiving elements through a lens (the images are taken when light goes through a lens onto the light receiving CCDs) and said correlation detecting unit is configured to detect said correlation using said plurality of second image data generated by said reference image generating unit (see page 508, correlation is detected using the several images that are made with different lens apertures, such as those shown in figure 4).

For claim 8, Geradts discloses an adding unit configured to add to said first image data additional data for preventing copyright infringement (this is the definition of a watermark, which is disclosed on page 511) when said identifying means identifies that said first image data was generated using said image generating apparatus (see the discussion of watermarking in section 3 on page 511, the watermark or serial number identifies that the image was made by the corresponding camera).

For claim 9, Geradts discloses said distinctive variations in light receiving sensitivity of said light receiving elements arise in the process of production of said light receiving elements and are difficult to artificially reproduce (see the discussion of pixel defects in section 2 pages 505-510).

For claim 10, which recites the method performed by the apparatus of claim 1, Geradts and Kalker disclose this method as discussed in the rejection of claim 1.

3. Claim 3 is rejected under 35 U.S.C. 103 as being unpatentable over Geradts and Kalker as applied to claim 1 above, and further in view of U.S. Patent No. 5,764,770 issued to Schipper et al. ("Schipper").

For claim 3, Schipper discloses a correlation detecting unit configured to cut out third image data from said first image data based on a first cutout position, to cut out fourth image data from said second image data based on a second cutout position, and to detect the correlation between said third image data and said fourth image data a plurality of times by changing said first cutout position and said second cutout position (see figures 9A-9G and col. 18 lines 10-45, the pixel array is decomposed into a plurality of smaller sub-regions, and the correlation of each sub-region of the image with the corresponding sub-region in the reference image is detected. That is, the correlation detecting means cuts out third image data based on a first cutout position, and cuts out fourth image data based on a second cutout position. See also figures 10-14).

It would have been obvious to one of ordinary skill in the art at the time of invention to include the cut out image data of Schipper for the benefit of reducing a number of pixels to a manageable size as taught by Schipper in col. 10 lines 15-17.

4. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geradts and Kalker as applied to claim 1 above, and further in view of Chen et al., *Symmetric Phase-Only Matched Filtering of Fourier-Mellin Transforms* ("Chen").

Geradts does not disclose generating correlation data by successively shifting in two dimensions a relative position between the first and second images.

For claim 6, Chen discloses correlation detecting unit is configured to generate the correlation data showing said correlation between said first image data and said second image data (see figure 1(a)) by successively shifting in two dimensions (see equation 20, R(u,v) for a grid M x K is determined) a relative position between an image of said first image data and an image of said second image data in units of image data corresponding to said light receiving elements (see section V Implementation from pp. 1159-1160, the two dimensional positions correspond to pixel positions where "The estimation accuracy" has "a sub-pixel precision").

It would have been obvious to one of ordinary skill in this art at the time of the invention to modify the camera identification device of Geradts and Kalker to include the correlation means of Chen for the advantages of obtaining a high discriminating power and an excellent robustness in the presence of noise as taught by Chen at col. 1 on page 1157.

For claim 7, Chen discloses a correlation detecting unit (see section IV Fourier-Mellin Invariant Matching beginning on page 1158) configured to orthogonally transform said first image data and said second image data to generate first frequency component data and second frequency component data (see steps 1 and 3, compute the Fourier transform), a dividing unit configured to divide each complex number data forming said first frequency component data by an absolute value of each complex number data to generate first complex number data (see equation 19, the complex number data is divided by an absolute value of each complex number data), and for dividing each complex number data forming said second frequency component data by an absolute value of each complex number data to generate second complex number data (see equation 19, the complex number data is divided by an absolute value of each complex number data), a substituting unit configured to substitute each complex number data forming one of said first complex number data and said second complex number data with complex conjugate complex number data to generate third complex number data (see step 5, the complex conjugate is substituted for each complex number), a multiplying unit configured to multiply the one of said first complex number data and second complex number data not substituted by said substituting unit and said third complex number data generated by said substituting unit to generate fourth complex number data (see equation 19, the complex numbers are multiplied), and an inverse transformation circuit configure to inverse orthogonally transform of said fourth complex number data generated by said multiplying unit to generate said correlation data (see step 6 compute the inverse Fourier transform).

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kurosawa et al., *CCD Fingerprint Method-Identification of a Video Camera from Videotaped Images* ("Kurosawa") in view of Chen and Kalker.

For claim 11, Kurosawa discloses an interface configured to receive first image data to be identified and a plurality of second image data generated by a predetermined image generating apparatus (see the abstract, 100 frames of 9 camcorders are accumulated. Presumably an interface receives these frames so that they can be compared as shown in figures 3 and 4), a storage unit configured to store the plurality of second image data (see page 538 "we used 9 camcorders" and captured "one hundred playback frames for each camera" so presumably the captured images are stored in a storage unit), and an identifying unit configured to identify that said first image data was generated using any of said plurality of image generating apparatuses (see page 538 section 3.2, each camera has its own dot pattern that identifies whether an image was taken by that camera).

Kurosawa also discloses detecting a correlation between a first image data and a plurality of second image data stored in said storage unit based on light receiving results of light receiving elements having distinctive variations in light receiving sensitivity of the predetermined image generating apparatus and to generate image correlation data (see the abstract, the clue to the individual camera identification is obtained from nonuniformity of dark currents on the CCD chips, which cause a fixed pattern noise. The pattern is quite unique and intrinsic to an individual camera.... Using these features, it is expected that the nonuniformity of dark currents makes it possible to specify only one camera among same model cameras. See also figures 2-6). Although Kurosawa discloses detecting a correlation, Kurosawa does not explicitly disclose the correlation detecting unit.

Chen discloses a correlation detecting unit configured to detect a correlation between said first image data and said plurality of second image data stored in said storage unit (see page 1159 col. 1, Chen can "identify among a set of reference images the image that best matches some observed image," see also pages 1163-1165).

It would have been obvious to one of ordinary skill in this art at the time of the invention to modify the camera fingerprint device of Kurosawa to include the correlation detecting unit of Chen for the advantages of obtaining a high discriminating power and an excellent robustness in the presence of noise as taught by Chen at col. 1 on page 1157.

Kurosawa and Chen do not disclose an identifying unit configured to identify that said first image data was generated using any of said plurality of image generating apparatuses when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data.

Kalker discloses an identifying unit configured to identify that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data (see the abstract the standard deviation of correlation values is determined and a threshold is set to a multiple of the standard deviation).

It would have been obvious to one of ordinary skill in the art at the time of invention to include the threshold of Kalker with the correlation device of Kurosawa and Chen in order to reduce false alarms as taught by Kalker in the abstract.

Response to Arguments

Applicant's arguments filed May 2, 2007 have been fully considered but they are not persuasive.

Applicant argues that Schipper, Geradts, Chen and Kurosawa fail to disclose "a correlation detecting unit configured to detect a correlation between said first image data and second image data based on light receiving results of light receiving elements having distinctive variations in light receiving sensitivity of the predetermined image generating apparatus and to generate correlation data; and an identifying unit configured to identify that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data."

The basis of applicant's allegations are unclear given the clear nature of the prior art. Applicant should clarify his argument.

Is applicant alleging that “identifying that said first image data was generated using said image generating apparatus when a value indicated by an origin of the correlation data is greater than a predetermined number of standard deviations based on the correlation data" is in fact unknown in the prior art? This feature is shown in the abstract of Kalker.

Is applicant alleging that “detecting a correlation between said first image data and second image data based on light receiving results of light receiving elements having distinctive variations in light receiving sensitivity of the predetermined image generating apparatus and to generate correlation data” is in fact unknown in the prior art? Many of the references in the art of record disclose this feature, including Kurosawa and Geradts as discussed in the above rejections.

The Examiner cites particular columns and line numbers in the references as applied to the claims for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in their entirety as potentially teaching all or part of the claimed invention, in addition to considering the context of the passage as taught by the prior art or as cited and applied by the Examiner.

Applicant is expected to understand the disclosed material in each reference cited in the art of record when amending the claim and alleging that a claim element is not disclosed in the prior art.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Raynor in U.S. Patent Number 7,129,973 discloses a method for authenticating an image taken by a camera using noise from the CMOS image sensor.

Prager et al. in U.S. Patent Number 5,726,915 discloses a method of generating a signature for an image sensor that is derived from noise in the sensor's output signal.

U.S. Patent Nos. 7,031,493 issued to Fletcher el al.; 6,076,004 issued to Kanayama et al.; and 6,628,845 issued to Stone et al. disclose methods of correlating images using symmetric phase-only matched filtering of Fourier-Mellin transforms.

Aufrichtig et al. in U.S. Patent Number 6,661,456 discloses a pattern in an image derived from defective pixels in the image detector.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSS
May 22, 2007

JINGGE WU
SUPERVISORY PATENT EXAMINER